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ABSTRACT

This experiment involves an attempt to develop a paradigm for measuring nonverbal expressiveness in young children, measured in terms of "sending ability" (an individual's ability to send accurate and appropriate nonverbal messages to others). Nursery school children viewed a series of 16 slides described as familiar, unfamiliar, unpleasant, or unusual. The child's mother watched his expression and tried to guess which slide the child was viewing. The child also rated each slide according to how it made him feel. Results indicated no sex differences in communication accuracy, which is contrary to findings in previous studies with adults. It was also possible to measure nonverbal communication in young children. A second study was designed to replicate the first and to relate individual differences in expressiveness to other measures of emotional expression. Results confirmed the first study, and also indicated that nonverbal expressiveness was related to other kinds of emotional behavior. (ST)

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Nonverbal communication of affect in children

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Nonverbal communication of affect in children[1]

This experiment involves an attempt to develop a paradigm for measuring nonverbal expressiveness in young children. There is evidence that nonverbal behavior may be a particularly important factor in the development of emotional expression and social behavior. Nonverbal behaviors accompany emotional states in many species of animals, and they often appear to play a role in the regulation of social behavior by aiding the process of communication between individuals (cf. Vine, 1969). Abnormalities in nonverbal behavior may disrupt normal social behavior. For example, the aberrant social behavior of deprived rhesus monkeys may be related to their inability to accurately "send" and "receive" the nonverbal messages appropriate to their species (Miller, Caul, and Mirsky, 1967). Among humans, nonverbal behaviors thought to signal "intimacy" have been shown to have considerable intra-individual stability over time, and have been related to low social anxiety (Patterson, 1973).

Measurement is a major problem in the study of nonverbal expression. Nonverbal behavior occurs in a complex flow, and the meaning of a particular response is often dependent upon the behaviors preceeding and following it, as well as the situational context. It is impossible to obtain an absolute measure of expressiveness: any measure is necessarily a function of the particular measuring system, and there are many approaches that one might take in developing a measuring system.

The present paradigm measured nonverbal expressiveness in terms of "sending ability": an individual's ability to send accurate and

appropriate nonverbal messages to others.[2] It was developed from studies in which an adult "sender" viewed and described his subjective reaction to a series of emotionally-loaded color slides (Buck, Savin, Miller and Caul, 1972; Buck, Miller, and Caul, 1973). There were five distinct kinds of slides: sexual, scenic, pleasant people, unpleasant, and unusual. Unknown to the sender, an observer watched via a hidden television camera the facial expressions and gestures the sender made while reacting to the slides. For each slide, the observer attempted to judge what kind of slide the sender had watched and how pleasant or unpleasant the sender's emotional reaction was. These judgments were compared to the actual slide seen by the sender and the sender's own rating of his emotional reaction.

Results indicated that statistically significant nonverbal communication occurred: the observers could correctly judge what kind of slide was shown more often than chance, and there were significant positive relationships between the sender's and observer's ratings of the sender's emotional responses to the slides. There were also large individual differences between senders in the amount of accurate communication. Women were consistently better senders than men, and accurate senders gave a more personal verbal report of their subjective response to the slides (See Buck et. al., 1973). Also, more accurate senders had smaller skin conductance and heart rate responses to the slides than did less accurate senders. Following Jones (1960), accurate senders with small physiological responses were termed "externalizers," while individuals showing

the opposite pattern of response were labeled "internalizers." Externalizers scored higher in extraversion and self esteem than did internalizers, and females tended to be externalizers and males internalizers.

The study of the development of nonverbal expression in children may do much to illuminate the meaning of these findings. It may be for example that the sex difference observed in adults is in part a result of socialization pressures that bear down more heavily on boys than on girls in our culture. Several investigators have suggested that nonverbal expression may become inhibited in the process of socialization (e.g. Izard, 1971), and both Jones (1960) and Lanzetta and Kleck (1970) have theorized that such inhibition is in some way associated with increased physiological responding. It may be that young boys are more likely to come to use an internalizing mode of emotional expression because they are generally discouraged more than girls from overtly expressing many emotions.

If this is true, it is possible that young children will not show the sex difference in nonverbal expression and physiological responding found in adults. Furthermore, it may be possible to study the development and determinants of this sex difference in progressively older samples of children. This experiment was designed as a first step in this direction.

Method--Experiment I

Subjects.

Ten males and five females comprising a class from the university nursery school served as senders. Their ages ranged

from 4 to 6; mean age was 67 mo. Two other children in the class were not run because of scheduling problems. The child's mother was the primary observer. In addition, videotapes of the child were judged by five male and five female undergraduate observers.

Procedure.

A series of 16 slides were created comprising four slides in each of four content categories. The first category was "Familiar People," showing the child himself and his friends at the nursery school. Each child was photographed in the school a month before the experiment. During the experiment, the child saw two slides of himself and two general views of the school. The second category of slides was "Unfamiliar People," depicting pleasant scenes of children and adults unknown to the child. The third slide category was "Unpleasant," consisting of pictures judged to be midly unpleasant to most children. These included the grotesque, clown-like face of a fashion model, a frightened character from a Dr. Suess book, a closeup of a grasshopper, and the painting "Echo of a Scream" by D.A. Siqueiros which depicts a crying child. The fourth slide category was "Unusual," which included double-exposures and strange photographic effects. It was hoped that the children would regard the Familiar People slides as relatively pleasant, the Unpleasant slides as unpleasant, and the other slides as being in between. The ordering of the slides was chosen by a randomly selected 4 x 4 latin square.

The child was brought to the experiment by his mother. They were greeted by the experimenter (R.B.) and an undergraduate assistant, Miss Janet Worthington. The experimenter reminded the child of the

time the child's picture was taken at school, and asked him if he wanted to see his pictures along with some others. All of the children brought to the laboratory complied, most with enthusiasm.

The child was seated in a room with J.W. facing a 12" x 12" back-lighted screen on a small table. A slide projector focused on the screen was placed on a larger table against the wall opposite the child. A 3" diameter pipe went through the wall under the table. A Sony 3200K camera in the next room was focused on the child's face through this pipe. The camera was virtually undetectable, and none of the children noticed it.

Initially, J.W. asked the child about his game preferences to provide data on sex-role identification. She asked him first if he liked, disliked or didn't care about a series of 20 activities. Six of these activities had been previously categorized as typical of the traditional female role (playing with dolls, cooking), and 5 had been judged as appropriate to the male role (playing soldier, airplanes). J.W. then asked the child to choose which he liked most of a pair of activities, one of which was "masculine" and the other "feminine." There were 10 such forced choices.

While the child was responding to these questions, the experimenter escorted the mother to another room. The mother's room was separated from the child's room by a third room which contained the camera, videotape equipment, and controls for the slide projector. The two walls and closed doors and the distance involved eliminated most of the transmission of sound between the

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child's room and the mother.

The mother sat facing a 18" television receiver which was turned on but the screen was blank. The experimenter explained that the camera was focused on the child, but that he could be seen only when the videotape recorder was turned on. He gave the mother a prepared rating form which was divided into sixteen rows: one for each slide. For each slide, there were places to mark defined by the slide categories Familiar People, Unfamiliar People, Unpleasant, and Unusual. To the right of these were places to mark defined by the adjectives Very Pleasant, Pleasant, Neutral, Unpleasant, and Very Unpleasant. The experimenter stated:

> "Name will be looking at a series of sixteen slides. There are four kinds of slides (pointing to the form)--Familiar People are pictures of name and his friends at school, Unfamiliar People slides are pleasant enough pictures of people he doesn't know, Unpleasant slides are mildly unpleasant, and Unusual slides show strange photographic effects. For each of these slides, I'd like you to watch name's face over TV and try to guess what kind of slide he's watching just by watching his facial expression. I'd also like you to try to rate how pleasant or unpleasant you think each slide made him feel by putting a mark in one of these columns (pointing). Do you have any questions?

The experimenter answered any questions and then proceeded to describe what would be seen on the television set:

> I'll turn on the TV just before the slide is turned on. You'll see name just before the slide comes on and see his initial reaction. Janet will ask him questions about the slide--you won't be able to hear his answers because the audio is turned down, but keep watching his face for clues about what he's watching. I'll turn off the TV just after the slide is turned off, so your screen will

> go blank. At that point, make your ratings about what kind of slide you think he saw and how pleasant or unpleasant you think his reaction to it was. Do you have any questions?

The experimenter went to the control room and briefly turned on the Sony AV3650 videotape recorder to make sure that the camera was focused properly and give the mother an example of what she would see. He then waited for the child to finish responding to the questions about game preferences.

When the game preference test was over, J.W. turned on the slide projector, positioned her chair so that she sat beside the child facing the screen, and explained to the child about the rating scale he would use. The rating scale consisted of drawings of five faces that went from very happy to very unhappy (See Figure 1).

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She stated:

> After the picture goes off, you tell me what you thought of it by pointing to one of these faces. If you really liked the picture and it made you feel really good point to the smiling face (demonstrating). If you really didn't like it at all point to this unhappy face. If you liked or didn't like it a little point to one of these faces. If you didn't feel anything one way or the other point to this face.

The experimenter then presented the first trial. A trial proceeded as follows: the experimenter turned on the videotape recorder and then presented a slide. The child looked at the slide for about five seconds and then J.W. asked "what do you think of that?" or "who's that?" if the child had not yet reacted. After 15-20 more seconds, the experimenter turned off the slide and then

the videotape recorder. J.W. then showed the child the series of faces, asked him how the slide made him feel, and recorded his answer. Throughout the trial, J.W. kept looking at the slide and not the child. This helped to keep the child's attention centered on the slide.

After the 16 trials, the child was brought to the mother's room, the experiment was explained to both, and the child was shown a portion of the videotape of his facial expressions.

The rating sessions with the undergraduate observers were run as follows. The observers were gathered in a classroom with the videotape recorder and 18" receiver at the front of the room. They were given prepared rating froms and instructions similar to those given the mother, and were asked to remain silent while making their ratings. They were shown the videotapes with brief pauses between the trials so they could make their ratings. They were not given feedback about what judgments were correct. Two 50 minute sessions were required, each involving 7-8 children.

Dependent Variables.

On each trial, the observer judged what kind of slide the child had seen, and rated on a five-point scale how pleasant or unpleasant the slide had made him feel. This yielded two measures of communication accuracy that are similar to the measures used in studies with adults: (a) the number of slides that the observer could correctly categorize (Categorization Measure), and (b) the Pearson correlation coefficient between the observer's ratings of the child's emotional reaction and the child's own ratings of his emotional reaction along the pleasant-unpleasant scale

(Pleasantness measure).

Results--Experiment I

Ratings of the Slides.

The children rated each slide along a five-point scale by indicating which of the faces in Figure 1 corresponded with their reaction. With larger ratings indicating a negative reaction, the mean rating of the Familiar People slides was 1.41, the rating of the Unfamiliar People slides was 2.48, that of the Unpleasant slides was 2.79, and that of the Unusual slides was 2.46. Mann-Whitney U tests indicated that the Familiar People slides were rated significantly more positive than any of the other three categories of slides ($p < .05$). One of the Unpleasant slides, that of the Dr. Suess character, was rated as being pleasant (its rating was 1.93), and one of the Unfamiliar People slides depicting two men was rated as rather unpleasant (its rating was 3.07). The rest of the slides were rated approximately as anticipated. One child, a boy, failed to give usable ratings: he rated all of the slides as neutral. The overall pattern of ratings suggested that most of the children could use the rating scale and that their reactions to most of the slides were similar to those intended.

Communication Accuracy.

The communication accuracy data are summarized in the upper part of Table 1. By chance, an observer should correctly identify four slides (25%) if the child communicates nothing about

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them. Chi squares were computed for each sender-observer pairing

and combined to arrive at overall probability figures. This procedure revealed that significant communication occurred when the mother was observing ($\underline{X}^2 = 24.74$, df = 15, $\underline{p} < .06$). A Mann-Whitney $\underline{U}$ test computed on the raw data indicated that there was no significant difference between boys and girls in the number of slides correctly categorized when the mother was observing.

The chi squares for the pairings with undergraduates were combined for an overall probability figure for each child. This revealed that 3 of the 5 girls and 2 of the 10 boys communicated a significant number of slides to the undergraduates ($p < .05$). This suggested that girls might be superior senders on this measure, but a Mann-Whitney $\underline{U}$ test indicated that this difference did not attain significance ($\underline{U} = 14$).

The Pearson correlation coefficients between the child's ratings and each observer's ratings were averaged to obtain overall probability figures. The boy who rated all of the slides as neutral was not included in this analysis. As Table 1 indicates, the average correlations between the child's ratings and his mother's ratings were highly significant. The correlation coefficients for the undergraduates, combined to give a probability figure for each child, revealed that 6 of the 14 children showed significant ($\underline{p} < .01$) communication. There were no significant differences between male and female senders on this measure.

Sex Role Identification.

No significant sex differences in communication accuracy were found in this study. However, clear differences emerged between

boys and girls in the game preference data. On the free choice measure, where the children were asked whether or not they liked a series of activities, male activities were liked equally by boys and girls, while female activities were apparently rejected by boys. Of the 5 male activities, boys said they liked an average of 3.89, while girls liked 3.40 (U = 24, Not significant). Of the 6 female activities, boys liked 1.33 and girls liked 5.20 (U = 1, p <.001). On the forced choice measure, both sexes were likely to choose sex-appropriate activities. Boys chose a mean of 8.89 male activities of the ten choices, while the girls chose a mean of only 3.00 male activities (U = 3, p <.01)

Discussion--Experiment I

Although the sample of subjects in this experiment is small, the data indicate that it is possible to measure significant nonverbal communication in young children. The data also indicated that there are large individual differences between children in nonverbal expressiveness. A second experiment was designed to replicate the results of the first study and to relate individual differences in expressiveness to other measures of emotional expression.

Method--Experiment II

Subjects.

Eight males and six females comprising the succeeding class at the preschool served as senders. Their ages ranged from 5 to 6 and the mean age was 66 mo. Two additional children could not be scheduled. Again, the child's mother was the primary observer and the videotapes of the child were judged by seven male and seven female undergraduates.

Procedure.

The experimental procedure was identical to that in Experiment I with the following exceptions. A different person, Miss Marguerite Zetwo, served as undergraduate assistant. Also, the unsuccessful Unpleasanc slide of the Dr. Suess character was replaced with a slide showing a crying woman taken from the TAT, and the Unfamiliar People slide seen as unpleasant was replaced. Finally, an attempt was made to measure the child's ability to role-play the facial expressions involved in different emotions.

The measure of role-playing ability was taken after the child had responded to the 16 slides. M.Z. then moved the small table on which the back-lighted projection screen was placed and put her own chair in that position so that the child would face toward the camera when he looked at her. She then said:

> I want you to show me what you face looks like when you feel different ways. What does you face look like when you're happy and glad about something? (Pause, with encouragement when necessary.) How about when you're sad and unhappy? (Pause) How about when you're scared and afraid? (Pause) How about when you're surprised at something? (Pause) How about when you're mad and angry about something?

The child's responses to these questions were videotaped and shown to the undergraduate observers after they had rated his responses to the slides. The audio was turned on so that the observers could tell exactly when the questions were asked. They rated each response on a seven-point scale defined by the bipolar adjectives "Appropriate facial response"-"Inappropriate response or no response." They also rated the child's overall role-playing ability along a seven-point scale.

Results--Experiment II

Ratings of the Slides.

The children rated the modified series of slides as intended. The mean rating of the Familiar People slides was 1.62, that of the Unfamiliar People slides was 2.68, that of the Unpleasant slides was 3.31, and that of the Unusual slides was 2.34. There was no overlap in the distributions of average ratings of the Familiar People slides, the Unpleasant slides, and the rest of the slides. The Familiar People slides were rated as more pleasant than the Unfamiliar People and Unusual slides ($U = 0$, $p = .002$), and the Unpleasant slides were rated as more unpleasant than the Unfamiliar People and Unusual slides ($U = 0$, $p = .002$).

Communication Accuracy.

The communication accuracy data are summarized in the lower part of Table 1. For the categorization measure, the chi squares of the child-mother pairing were combined as before, showing that significant overall communication occurred when the mother was observing ($\chi^2 = 34.73$, $df = 14$, $p < .01$). There was again no significant difference between boys and girls on this measure when the mother was observing. However, when the undergraduates were observing, girls were better senders on this measure than boys. As before, the chi squares for each pairing were combined to give an overall probability figure for each child, revealing that 5 of the 6 girls vs. only 3 of the 8 boys showed significant ($p < .05$) communication. A Mann-Whitney U test indicated that this sex difference was significant ($U = 10$, $p = .041$).

The correlation coefficients between the child's ratings and each observer's ratings were averaged as before. As Table 1 indicates, the average correlations between the child's ratings and his mother's ratings were again highly significant. The average correlation coefficients of the undergraduates for each child indicated that 8 of the 14 children showed significant ($p < .01$) communication. As before, there were no significant differences between the girls and boys on this measure of communication.

Sex Role Identification.

The pattern of results on the game preference measure was similar to that in the first study. Girls liked the female activities more than did boys ($U = 0$, $p < .001$), boys liked male activities somewhat more than did girls ($U = 8$, $p = .021$), and boys chose more male games than did girls ($U = 0$, $p < .001$).

Role Playing.

The mean ratings by the undergraduates of the appropriateness of the child's facial responses when asked to role-play are presented in Table 2. Girls and boys showed a similar ordering in their rated ability to enact the expressions appropriate to

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different emotions. They were best at showing happiness and progressively worse at enacting sadness, surprise, fear, and anger. Multiple sign tests, done with the criterion of significance set at $p < .01$, indicated that the expressions of happiness were rated significantly more appropriate than those of fear and anger. There

were no significant differences between boys and girls on rated of role-playing ability.

Individual Differences.

As in the previous experiment, marked differences between children in their ability to send accurate nonverbal messages was noted. These differences were consistent across the different measures of sending ability used in this study. Table 3 shows that all of the intercorrelations between the different measures were positive and most were significant, so that a child who was

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a poor sender when observed by undergraduates also tended to be a poor sender to his mother and be rated as poor in role-playing.

These measures of sending ability were correlated with the child's scores on the Minnesota Child Development Inventory. Few significant relationships were found, perhaps because all of the children in the sample attained high scores on the inventory and the range on that variable was restricted.

To further explore the meaning of the individual differences in sending ability, a 36-item scale was constructed from the results of previous experiments that investigated internalizing vs. externalizing modes of response to emotion (Block, 1957; Learmonth, Ackerley, and Kaplan, 1959; Jones, 1935; 1960; Lanzetta and Kleck, 1970; Buck et. al., 1972; 1973). The scale consisted of a series of statements, most of which referred to attributes previously found to distinguish "internalizers" and "externalizers." For example, different

items asked whether the stimulus person "plays alone most of the time," "often shows aggression," "is co-operative," etc. The rater was asked to judge whether each attribute was always, often, sometimes, rarely, or never characteristic of the stimulus person.

This scale was given to three teachers at the nursery school who were familiar with all of the children but who did not know the results of the communication experiment. Their ratings of the 14 children on each item were correlated with the childrens' sending ability. These correlations were then averaged across the three teachers, and probability figures were computed. This procedure indicated that, with boys and girls analyzed separately, and using all measures of expressiveness, sending ability was significantly related to a number of other kinds of emotional expression. In particular, sending ability was positively related to ratings of a high activity level, direct expression of hostility, and being an "extravert." Sending ability was negatively related to rated co-operation, emotional control, and solitary play.

The relationships between the teachers' ratings and three of the measures of sending ability are summarized in Table 4. One feature stands out from this data. Sending ability was related to

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a number of characteristics that might potentially disturb social relationships, such as bossiness, impulsivity, aggressiveness, and low co-operation. However, sending ability was also related to having many friends at the school, and it was negatively related

to shyness and solitary play.

Discussion

The experiments establish that it is possible to measure nonverbal expressiveness or sending ability in young children in a brief testing session that was enjoyed by most children, and that it is possible to use special rating scales with children of this age in the process of this measurement. The experiments did not find evidence of a large sex difference in expressiveness in these children. They did find initial indications that the present measures of nonverbal expressiveness are related to other kinds of emotional behavior.

Sex Differences

The game preference measure was included in these experiments to determine whether these children were in fact influenced by the traditional sex-role in the face of possible current concern about sexual stereotyping among their parents. The data indicate that these children showed a very strong tendency to choose sex-appropriate games, suggesting that they have indeed been affected by the traditional sex roles, at least in this respect. Thus whatever the reason for the lack of a large sex difference in sending ability in these experiments, it was probably not because of a lack of traditional sex-role identification among these children.

It may be that the children in this experiment were simply too young to show a sex difference in expressiveness. Assuming that the learning of sex-appropriate patterns of expressive behavior is in fact the cause of the sex difference in sending ability among

adults, it might be expected that such learning is more difficult and takes more time than the learning of sex-appropriate games. Also, in Experiment II, the undergraduate observers guessed the kind of slide being viewed by the girls more accurately than they did the boys. Perhaps this indicates the initial emergence of the eventually greater sending ability of women. This can be investigated in experiments using older groups of children.

Role-Playing Ability.

The fact that the undergraduate observers' ratings of role-playing ability was related to the measures of communication accuracy is interesting, although it should be noted that the observers made these ratings after they had seen the child respond to the 16 slides, and it is possible that their impressions of the child's communication accuracy may have influenced their rating of his role-playing ability. The lower ability of the children to role-play the emotions of fear and anger was not predicted, but it is consistent with the general contention that socialization inhibits the expression of socially undesirable emotions. A similar finding has been reported by Odom and Lemond (1972), although these investigators found that children could produce appropriate expressions of anger.

One interesting aspect of the role playing data might be noted. Figure 4 shows that among girls, the teacher's ratings were related more closely to the measures of spontaneous facial expressiveness than they were to the ratings of role playing ability, while among boys the opposite was the case. This pattern of

relationships was not predicted and any attempt at explanation must be very tentative. However, one might speculate that the behavior the teacher saw in the nursery school was more based upon natural expressiveness than role playing in girls, and more based upon role playing than natural expressiveness in boys. This would be consistent with the hypothesis that the socialization of emotional expression is more severe among males in our culture.

Individual Differences

The pattern of relationships between sending ability and the teachers' ratings depicted expressive children as being sociable and having many friends, even though they are also often impulsive, aggressive, bossy, and hard to get along with. This picture of the outgoing but impulsive externalizer and the responsible but inhibited internalizer is consistent with the results of other studies using very different procedures and populations of subjects. For example, Jones (1960) found among adolescents (ages 12-18) that "high GSR reactors" (internalizers) were quiet, reserved, good-natured and co-operative, while "low GSR reactors" (externalizers) were talkative, animated, active and impulsive. Block (1957) found among medical schoo. applicants that high reactors were, among other things, mannerly, submissive, and withdrawing; low reactors were independent, ingenious, and rebellious. Recently, Crider and Lunn (1971) found electrodermal lability to be negatively related to extraversion and impulsivity.

The fact that these attributes taken from the literature were found to relate to the present measures of sending ability in children suggests that these measures can be meaningfully used

to study the development of internalizing and externalizing modes of emotional expression. The present results also suggest a tentative hypothesis to guide such a study. We have seen that sending ability in adults has been related to personality differences involving intraversion-extraversion and self esteem, and to sex differences. In young children, a relationship with emotional behaviors which seem relevant to these personality differences is present while a sex difference is not. If one makes the assumption that the behavior of these young children is more based upon innate temperamental propensities and less based upon socialization than the behavior of adults, it suggests the hypothesis that the personality difference in facial expressiveness may be based upon innate factors while the sex difference is based upon socialization. This is, of course, offered as a very tentative hypothesis pending more data.

The Measurement of Sending Ability.

As the present paradigm for measuring sending ability is like all others dependent upon the particular procedures of measurement, it might be well to discuss and give the rationale for these procedures. Frijda's (1969, pp. 172-176) analysis of studies of emotional recognition accuracy can be applied to this problem. Frijda points out that studies of recognition accuracy differ according to several dimensions: (a) the nature of the stimuli employed, (b) the range of those stimuli, (c) the nature of the task confronting the observer, (d) the responses permitted

to the observer, and (e) the computation of accuracy scores. The following paragraphs describe and give the rationale for the approach that the present paradigm makes in each of these areas.

1. Regarding the nature of the stimuli, the present approach shows observers the televised sequences of the spontaneous expressions of senders to different kinds of emotionally loaded slides. The use of such stimuli avoids the criticisms leveled against studies using posed expressions and/or single photographs.

2. Regarding the range of stimuli employed, this approach samples a number of different stimulus emotions by showing the sender different kinds of slides. Thus, there is at least some attempt to approach the problems of sampling different kinds of emotions that have been pointed out by Brunswik (1956) and others.

3. Frijda has distinguished three kinds of tasks that have been used in recognition studies. "Situational reference" consists of identifying the kind of situation that evokes the stimulus emotion, "action anticipation" consists of anticipating the sender's behavior, and "emotional experience" involves labeling or rating the stimulus emotion directly (Frijda, 1969). The present approach provides both a situational reference task, in that the observer chooses the kind of slide that evoked the sender's response, and an emotional experience task, in that the observer rates the sender's emotional experience directly.

4. The responses permitted to the observer include choosing which kind of slides was presented on each trial, and rating the pleasantness of the sender's emotional response. Observers have

readily grasped the meaning of these tasks, they have been able to respond quickly, and these responses have been found to be useful in measuring communication accuracy in several studies.

5. The scoring system allows for the computation of accuracy scores whose significance can be tested. The "Categorization measure" of the number of correct categorizations of slides relative to chance can be evaluated for each subject by chi square tests, and then combined for group chi squares (McNemar, 1955). The "Pleasantness measure" consists of a correlation coefficient computed between the sender's and observer's ratings of the sender's emotional experience. The significance of the individual correlation coefficients may be tested, and they can be transformed to z scores and averaged to obtain group correlation indices (McNemar, 1955).

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Footnotes

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[2]This paper will use the following terminology: "Nonverbal expressiveness" is a general concept defined in terms of "sending ability," which is measured primarily by "communication accuracy" and also "role-playing ability."

Table 1

Summary results from four measures of communication accuracy.

Sender		Mother's Rating		Mean values from ratings by undergraduates	
		Categorization Measure	Pleasantness Measure	Categorization Measure	Pleasantness Measure
Study #1	Girls (n=5)	34%	+.57**	34%	+.16
	Boys (n=10)	36%*	+.32**	29%	+.27
Study #2	Girls (n=6)	41%**	+.33**	40%	+.28
	Boys (n=8)	37%*	+.27**	33%	+.16

Note. - Probability figures below refer to mother's ratings only.

See text for discussion of significance levels for undergraduates.

* $p < .05$

** $p < .01$

Table 2

Mean ratings of the appropriateness of the childrens' enactments of different emotions. (High rating indicates appropriate enactment).

Sex of child	Happy	Sad	Suprised	Afraid	Angry	Overall rating: Role-Playing Ability
Girls	3.67	3.36	2.98	2.68	1.77	2.88
Boys	3.99	3.49	2.92	2.69	2.44	3.12
Average	3.87^{a}	3.44^{ab}	2.94^{ab}	2.69^{b}	2.18^{b}	

Note. - Differences between emotions were tested by multiple sign tests. Cells with subscripts in common were not significantly different from one another at the .01 level of confidence.

Table 3

Interrelationships between four measures of communication accuracy and rated role playing ability

	Mother Cat. Measure	Mother Pleas. Measure	Und. Cat. Measure	Und. Pleas. Measure	Overall Rating: Role Playing
Mother--Categorization Measure	---	+.49*	+.55**	+.40	+.32
Mother--Pleasantness Measure		---	+.24	+.74***	+.54*
Undergraduates--Categorization Measure			---	+.58**	+.19
Undergraduates--Pleasantness Measure				---	+.38

* $p < .05$
** $p < .025$
*** $p < .01$

Table 4

Relationships between teachers' ratings and measures of nonverbal sending ability

Teacher's Rating	Girls (n=6)			Boys (n=8)		
	Overall Rating: Role-Playing	Mother's Pleasantness Measure	Rater's Pleasantness Measure	Overall Rating: Role-Playing	Mother's Pleasantness Measure	Rater's Pleasantness Measure
Items negatively correlated with sending ability						
Plays along much of the time.	-47	-44	-34	-66***	-85***	-50**
Is shy, fear strangers.	-54	-64**	-62**	-54	-14	-09
Keeps to himself.	-41	-43	-34	-62***	-77***	-54**
Is emotionally inhibited.	-42	-52*	-50*	-44**	-19	-23
Controls his emotions.	-42	-76*	-84**	-72***	-51**	-34
Is quiet and reserved.	-35	-56**	-61**	-57***	-12	-23
Is co-operative.	-27	-65**	-79***	-70***	-42*	-25
Is an "introvert."	-46	-59**	-61**	-65***	-33	-41*
Items positively correlated with sending ability						
Often shows aggression.	+43	+68***	+81***	+66***	+31	+22
Has a high activity level.	+12	+78***	+82***	+54***	+12	+01
Has many friends at the school.	+80***	+78***	+73***	+35	+44*	+32
Expresses his feelings openly.	+62*	+64**	+68**	+51***	+07	-01
Is impulsive.	+31	+47*	+46*	+69***	+23	+24
Is often difficult to get along with	+43	+71***	+78***	+53**	+21	+27
Expresses his hostilities directly	+35	+55**	+54*	+83***	+68***	+48**
Tends to be rebellious and nonconforming.	+30	+52**	+68***	+72***	+11	-11
Is bossy.	+15	+60**	+67***	+69***	+18	+16
Often dominates other children.	+24	+52*	+65***	+54**	+14	+19
Is an "extravert."	+41	+59**	+63**	+57**	+38	+11

Note. - Correlations in the table are the averaged correlations of three teachers.

* $p < .05$
** $p < .025$
*** $p < .005$

Figure Caption

Fig. 1. Scale used by the child to rate his emotional experience.

Point to the picture that shows how the slide made you feel.

VERY HAPPY

HAPPY

NEUTRAL

UNHAPPY

VERY UNHAPPY